UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/022,659	12/18/2001	Kameran Azadet	14-6	1760

7590 03/03/2005

Ryan, Mason & Lewis, LLP
Suite 205
1300 Post Road
Fairfield, CT 06430

EXAMINER	
TALAPATRA, ANIKA F	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 03/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/022,659	AZADET ETAL.	
	Examiner	Art Unit	
	Anika F. Talapatra	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12/18/2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/18/2001*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 18 December 2001 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 4-6, 8-9, 13-14, and 16-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al. (U.S. Patent 5546430) (hereafter referred to as Liao) further in view of Phanse (U.S. Patent 6798828) (hereafter referred to as Phanse).

As to claims 1 and 8, Liao teaches a method and receiver for decoding a signal received from a dispersive channel causing intersymbol interference (ISI) (Liao, column 5, lines 53-55; column 6, lines 53-58), comprising the steps of: generating a super-trellis representing the coding system used and

the dispersive channel and performing joint equalization and decoding of the received signal using the trellis (Liao, column 2, lines 48-59; column 8, lines 21-26; column 11, lines 26-60; column 14, lines 37-55; figures 5 and 9). Liao teaches the use of 4s8p-Trellis Coded Modulation (TCM) coding (Liao, column 11, lines 26-60; figure 5), but Liao does not teach the use of Multilevel Threshold-3 (MLT-3) coding. Phanse teaches the use of MLT-3 coding in a dispersive channel causing ISI (Phanse, column 2, line 26- column 3, line16). It is well known in the art at the time of the invention to use MLT-3 coding because MLT-3 coding has radiation emission concentrated at lower frequencies, and therefore MLT-3 coding more easily meets Federal Communications Commission (FCC) standards for transmission over twisted pair cables; and, multilevel, 3 or more symbols, such MLT-3 coding, allow higher speed data transmission. As well, Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention to use MLT-3 coding in the system taught by Liao, in order to achieve radiation emission concentrated at lower frequencies, and higher speed data transmission, then other coding systems.

As to claim 2 and 9, Liao teaches a method and receiver, wherein reduced complexity sequence estimation, or reduced-state sequence estimation (RSSE), is used in performing joint equalization and decoding of the received signal (Liao, column 10, lines 55-60; column 14, lines 38-68).

As to claims 4 and 13, Liao teaches a method and receiver wherein generating a trellis representing the coding system used and the dispersive channel further comprises concatenating a trellis representing the coding system and a trellis representing the dispersive channel, generating a super-trellis (Liao, column 14, lines 37-55; figure 9). Liao does not teach the use of MLT-3 coding. Phanse teaches the use of MLT-3 coding. A trellis representing MLT-3 code can be formed. It is well known in the art at the time of the invention to use MLT-3 coding because MLT-3 coding has radiation emission concentrated at lower frequencies, and MLT-3 coding allows higher speed transmissions. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention, to

use MLT-3 coding in the system taught by Liao, in order to achieve radiation emission concentrated at lower frequencies, and higher speed data transmission.

As to claim 5, Liao teaches a method for receiving a signal. Liao does not teach the use of MLT-3 codes. Phanse teaches the use of MLT-3 codes, wherein the MLT-3 code uses three signal levels to represent two binary values (Phanse, column 2, lines 32-46). It is well known in the art at the time of the invention to use MLT-3 coding because MLT-3 coding has radiation emission concentrated at lower frequencies, and MLT-3 coding allows higher speed transmissions. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention, to use MLT-3 coding in the system taught by Liao, in order to achieve radiation emission concentrated at lower frequencies, and higher speed data transmission.

As to claims 6 and 14, Liao teaches a method and receiver, wherein a trellis representing the 4s8p-TCM coding has as least two branches leaving or entering each state, each of the branches corresponding to state transitions associated with binary values (Liao, figure 5). Liao does not teach the use of MLT-3 coding. Phanse teaches the use of MLT-3 coding. MLt-3 coding may be used, wherein a representing the MLT-3 code has as least two branches leaving or entering each state, each of the branches corresponding to state transitions associated with binary values. It is well known in the art at the time of the invention to use MLT-3 coding because MLT-3 coding has radiation emission concentrated at lower frequencies, and MLT-3 coding allows higher speed transmissions. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention, to use MLT-3 coding in the system taught by Liao, in order to achieve radiation emission concentrated at lower frequencies, and higher speed data transmission.

As to claim 16, Liao teaches a method for receiving a signal. Liao does not teach the use of MLT-3 codes. Phanse teaches the use of MLT-3 codes, wherein the MLT-3 code uses three signal levels to represent two binary values (Phanse, column 2, lines 32-46). Phanse teaches the use of MLt-3 coding, wherein a trellis

representing the MLT-3 code can be formed which has as least two branches leaving or entering each state, each of the branches corresponding to state transitions associated with binary values. It is well known in the art at the time of the invention to use MLT-3 coding because MLT-3 coding has radiation emission concentrated at lower frequencies, and MLT-3 coding allows higher speed transmissions. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention, to use MLT-3 coding in the system taught by Liao, in order to achieve radiation emission concentrated at lower frequencies, and higher speed data transmission.

As to claims 17-19, Liao teaches a method for receiving a signal. Liao teaches the use of 4s8p-TCM coding, wherein a first trellis state has a previous value of +1, a second and third trellis states has a previous value of 0, and a third trellis state has a previous value of –1 (Liao, figure 5c). For example, S0 may have the value of +1, S1 and S2 may have the value of 0, and S3 may have the value of –1. Liao does not teach the use of MLT-3 codes. Phanse teaches the use of MLT-3 codes, where a trellis similar to 5c ay be formed for the MLT-3 coding method, with the same trellis states. It is well known in the art at the time of the invention to use MLT-3 coding because MLT-3 coding has radiation emission concentrated at lower frequencies, and MLT-3 coding allows higher speed transmissions. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention, to use MLT-3 coding in the system taught by Liao, in order to achieve radiation emission concentrated at lower frequencies, and higher speed data transmission.

As to claims 20 and 21, Liao teaches a method and receiver for decoding a signal comprising the steps of: generating a super-trellis representing the coding system used and the dispersive channel and performing joint equalization and decoding of the received signal using the trellis (Liao, column 14, lines 37-55; figure 9).

3. Claims 3, and 10-12 rejected under 35 U.S.C. 103(a) as being unpatentable over Liao, further in view of Phanse, as applied above to base claims 1 and 8, further in view of Malmberg et al. (U.S. Patent Application Publication 2002/0150180) (hereafter referred to as Malmberg).

As to claims 3 and 11, Liao teaches a method and receiver. Liao does not teach the Viterbi algorithm is used in performing joint equalization and decoding of the received signal. Malmberg teaches the use of the Viterbi algorithm in a reduced-state trellis system (Malmberg, paragraph 30). It is well known in the art at the time of the invention to use the Viterbi algorithm, because the Viterbi algorithm uses less power, and has a fixed coding time, compared to other coding methods. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention, to use the Viterbi algorithm in the system taught by Liao, in order to achieve a fixed coding time, and to use less power in data transmission.

As to claims 10 and 12, Liao teaches a receiver wherein RSSE is used to generate a reduced-state trellis. Malmberg teaches the use of the Viterbi algorithm in a reduced-sate trellis system. Liao does not teach the steps of searching the super-trellis. Malmberg teaches searching the super-trellis, comprising the steps of: calculating for each received symbol the Euclidian distance to the symbol (a branch metrics unit); determining which of those symbols has the minimum Euclidian distance (an add-compare-select unit); storing the symbol information for the symbol that has the minimum Euclidian distance to the received symbol (a survivor memory unit); and returning soft-value information to the decoder to be used in error reduction (a decision-feedback unit) (Malmberg, paragraphs 67-68; figure 7).

4. Claims 7, 15, and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Liao, further in view of Phanse, as applied above to base claims 1, 8, and 16, further in view of Chan (U.S. Patent 6744831) (hereafter referred to as Chan). Liao teaches a method and receiver. Liao does not teach a

receiver wherein the dispersive channel is an ethernet channel. Chan teaches a receiver, wherein the dispersive channel is an ethernet channel (Chan, column 1, lines 25-46). It is well known in the art at the time of the invention to use an ethernet channel, because an ethernet channel allows much higher data rates than previously achieved. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention, to use an ethernet channel, in the system taught by Liao, in order to achieve much higher data rates.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

i. U.S. Patent 5031195, Chevillat et al.;

ii. U.S. Patent 6081562, He et al.;

iii. U.S. Patent Application Publication 2003/0053535, Malkov et al.;

iv. U.S. Patent Application Publication 2003/0115061, Chen; and

v. U. S. Patent 5214672, Eyuboglu et al. (figures 1, 5-6).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anika F. Talapatra whose telephone number is 571-272-6039. The examiner can normally be reached on Monday to Friday, 08:00-16:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. T.

KEVIN BURD
PRIMARY EXAMINER